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Databases selected: Multiple databases...

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All sources | Trade Publications | Newspapers

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1. **New uses for COLD**
   Mason Grigsby. **Transform Magazine.** San Francisco: Nov 1998. Vol. 7, Iss. 11; p. 18 (9 pages)
   Text+Graphics | Page Image - PDF | Citation

2. **Banks use expanded services to compete for emerging affluence**
   Ragsdale, Rose. **Alaska Journal of Commerce.** Anchorage: Oct 26, 1998. Vol. 22, Iss. 43; p. 18
   Full text | Abstract

3. **Banks use expanded services to compete for emerging affluence**
   Ragsdale, Rose. **Alaska Journal of Commerce.** Anchorage: Oct 26, 1998. Vol. 22, Iss. 43; p. 18
   Full text | Abstract

4. **STATE DEPARTMENT CREDIT UNION MAKES A CASE FOR IMAGING**
   Item Processing Report. Potomac: Oct 22, 1998. Vol. 9, Iss. 21; p. 1
   Full text | Abstract

5. **CD-ROM GAINING ACCEPTANCE AMONG PROCESSORS Technology Faces Tough Competition From Internet Distribution**
   Item Processing Report. Potomac: Jun 18, 1998. Vol. 9, Iss. 12; p. 1
   Full text | Abstract

6. **Check imaging technology**
   Phil Britt. **Community Banker.** Washington: Jan 1998. Vol. 7, Iss. 1; p. 24 (6 pages)
   Full text | Page Image - PDF | Abstract

7. **Sweetening the appeal of ATMs**
   Alison F Orenstein. **Bank Systems & Technology.** New York: Nov 1997. Vol. 34, Iss. 11; p. 38 (4 pages)
   Text+Graphics | Page Image - PDF | Abstract

8. **Texas banks embrace imaging**
   Paige Chadwick. **Texas Banking.** Austin: Oct 1997. Vol. 86, Iss. 10; p. 8 (2 pages)
   Text+Graphics | Page Image - PDF | Abstract

9. **Seeing is believing**
   Eileen Courter. **Credit Union Management.** Madison: Aug 1997. Vol. 20, Iss. 8; p. 26 (4 pages)

Full text Page Image - PDF Abstract

10. **End of the paper chase**
Claire Ramster. **Banking Technology.** London: Jul/Aug 1997. Vol. 14, Iss. 6; p. 32 (4 pages)
Full text Page Image - PDF Abstract

11. **INDUSTRY BRIEFS**
EFT Report. New York: Apr 23, 1997. Vol. 20, Iss. 9; p. 1
Full text Citation

12. **CD storage revs up**
Matt Hamblen. **Computerworld.** Framingham: Apr 7, 1997. Vol. 31, Iss. 14; p. 28 (1 page)
Text+Graphics Page Image - PDF Abstract

13. **PRODUCT NEWS**
Item Processing Report. Potomac: Jan 16, 1997. p. 1
Full text Citation

14. **REMITTANCE, CHECK PROCESSING NOW IN ONE SYSTEM AT CRESTAR**
Corporate EFT Report. Potomac: Dec 25, 1996. p. 1
Full text Citation

15. **Tech Bytes: Bank of West Adds To Imaging Services**
Liz Moyer. **American Banker (pre-1997 Fulltext).** New York, N.Y.: Nov 4, 1996. Vol. 161, Iss. 212; p. 36
Full text Abstract

16. **Bank of the West introduces two new image services based on CheckVision software by IA Corp.**
Leger, Thierry. **Business Wire.** New York: Oct 23, 1996. p. 1
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17. **CRESTAR BANK PURCHASES FULLY INTEGRATED SYSTEM**
Financial Services Report. Potomac: Oct 23, 1996. p. 1
Full text Citation

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19. **Intuit's simpler home banking software**
Anonymous. **American Bankers Association. ABA Banking Journal.** New York: Aug 1996. Vol. 88, Iss. 8; p. 52A (2 pages)
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20. **PANINI REDUCES PRICES FOR S1 READER-SORTER**
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21. **UNISYS TARGETS COMMUNITY BANK MARKET Vendor Releases Windows NT-bas d Transport**
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22. **Texas Banking 1996 Spring Buyer's Guide**
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Full text Abstract

23. **INTEREST IN IMAGE STATEMENTS ON THE UPSWING**
Financial Services Report. Potomac: Feb 28, 1996. p. 1
Full text Citation

24. **Imaging: Saving your customers from a shower of checks**
Morrall, Katherine. **ABA Bank Marketing.** Washington: Jan 1996. Vol. 28, Iss. 1; p. 24 (9 pages)
Full text Page Image - PDF Abstract

25. **Cyberbanks: Know thy customer**
Cohen, Jackie. **Bank Technology News.** New York: Dec 1995. Vol. 8, Iss. 12; p. 14 (3 pages)
Full text Abstract

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STEVEN MARJANOVIC. **American Banker (pre-1997 Fulltext).** New York, N.Y.: Nov 13, 1995. Vol. 160, Iss. 219; p. 19
Full text Abstract

27. **BANKS INCREASE FEES WITH IMAGE-CASH MANAGEMENT**
Item Processing Report. Potomac: Nov 9, 1995. p. 1
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28. **Citi Commits $6M to Wholesale Image Project with IBM**
STEVEN MARJANOVIC. **American Banker (pre-1997 Fulltext).** New York, N.Y.: Aug 14, 1995. Vol. 160, Iss. 155; p. 18
Full text Abstract

29. **Corporate Services: Keycorp to Use Image-Based Lockbox System fromBanctec Series: 13**
DANIEL STRACHMAN. **American Banker (pre-1997 Fulltext).** New York, N.Y.: Feb 15, 1995. Vol. 160, Iss. 31; p. 16
Full text Abstract

30. **Bank of Boston Will Offer CD-ROM Imaging Series: 13**
DANIEL STRACHMAN. **American Banker (pre-1997 Fulltext).** New York, N.Y.: Dec 28, 1994. Vol. 159, Iss. 247; p. 9
Full text Abstract

1-30 of 35 < First | < Previous 1 2 Next >

Results per page: 30

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PDN(<12/22/1998) and (day or daily) and (week or weekly) and (month or r Search Clear

Database: Multiple databases... Select multiple databases

Date range: All dates

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Results

18 articles found for: *PDN(<12/22/1998) and (film or photography or photographic) and (recall or recalled or recalling) and (manufacturer or kodak or fuji or canon or fujifilm) and (reseller or retailer or distributor) and ((lot or serial or film or cartridge) pre/1 number)*

All sources | Scholarly Journals | Magazines | Trade Publications | Newspapers

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1. **How to buy photocopiers**
Anonymous. **Library Technology Reports.** Chicago: Mar/Apr 1998. Vol. 34, Iss. 2; p. 119 (58 pages)
Text+Graphics | Page Image - PDF | Abstract

2. **Product traceability: A guide for locating recalled manufactured goods**
Gigi M Lipton. **Quality Congress. ASQ's ... Annual Quality Congress Proceedings.** Milwaukee: 1998. p. 423 (9 pages)
Text+Graphics | Page Image - PDF | Citation

3. **Guide to manufacturing software**
Bellone, Robert. **Accounting Technology.** Boston: May 1996. Vol. 12, Iss. 4; p. 18 (12 pages)
Full text | Abstract

4. **Road ready**
Binder, Mark. **Home Office Computing.** Boulder: May 1996. Vol. 14, Iss. 5; p. 71 (7 pages)
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5. **Karsh & Hagan worthy lottery-account winner; [Rockies Edition]**
Penny Parker Denver Post Business Writer. **Denver Post (pre-1997 Fulltext).** Denver, Colo.: Jun 26, 1995. p. E.02
Full text | Abstract

6. **Country skills: Practically used farm tractors**
Vivian, John. **Mother Earth News.** Hendersonville: Jun 1994. p. 34 (13 pages)
Full text | Page Image - PDF | Abstract

7. **Counterfeiting's high-tech era; [City Edition]**
Josh Hyatt, Globe Staff. **Boston Globe (pre-1997 Fulltext).** Boston, Mass.: Dec 6, 1992. p. 49
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8. **SMART MONEY Product Recalls Spewing Isuzus, faulty drugs and tanning beds; [NASSAU AND SUFFOLK Edition]**
STATES NEWS SERVICE. **Newsday (Combined editions).** Long Island, N.Y.: May 27, 1992. p. 39
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9. **Many Nonfatal Shootings Get Scant Police Attention Guns: Victims are interviewed briefly or n t at all. Harried police seldom use crime lab, rarely trac weapons. Series: UNDER FIRE. The proliferation of guns in Los Angel s County. One in a series.; [Hom Edition]**
DAVID FREED. **Los Ang les Times (pre-1997 Fulltext).** Los Angeles, Calif.: May 20, 1992. p. 1
Full text Abstract

10. **Painstaking Trace on Illegal Gun Hinges on Paper, Memory Series: IN THE LINE OF FIRE: THE PATH OF A GUN Series Number: OCC.; [FINAL Edition]**
Pierre Thomas. **The Washington Post (pre-1997 Fulltext).** Washington, D.C.: Nov 26, 1991. p. a.01
Full text Abstract

11. **SMART MONEY Product Recalls Mislabeled medications, sputtering Volkswagens; [NASSAU Edition]**
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12. **Product Recalls Faulty heart defibrillators and defective pacemakers; [NASSAU AND SUFFOLK Edition]**
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STATES NEWS SERVICE. **Newsday (Combined editions).** Long Island, N.Y.: Dec 19, 1990. p. 59
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15. **Wheeling-Dealing Gray Market Hits the Skids Bad Publicity, Corporate Action, Legislation Put Brakes on Car Conversions; [Home Edition]**
PAUL DEAN. **Los Angeles Times (pre-1997 Fulltext).** Los Angeles, Calif.: Jul 11, 1986. p. 1
Full text Abstract

16. **COVER STORY THE ELECTRONIC NET POLICE RADAR AND PUBLIC RIGHTS Motorists frequently curse it, and try by various means to avoid being entrapped by it. But police radar is here to stay, even if there is disagreement among experts over how accurate it really is.; [ALL EDITIONS]**
BY BOB KEELER. Bob Keeler is Newsday's state editor. **Newsday (Combined editions).** Long Island, N.Y.: Jun 1, 1986. p. 10
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17. **Fade-Out, Fade-In; New Technologies, Markets Have Begun to Overshadow the Screen**
GIGI MAHON. **Barron's National Business and Financial Weekly (1942-Current file).** Boston, Mass.: Apr 13, 1981. Vol. 61, Iss. 15; p. 4 (8 pages)
Article image - PDF Page map Abstract

18. **R search in marketing**
Revzan, David A.. **Journal of Marketing (pre-1986).** New York: Jul 1953. Vol. 18; p. 60 (87 pages)
Page Image - PDF

Citation

1-18 of 18

Results per page: 30

Basic Search

Tools: Search Tips Browse Topics 2 Recent Searches

PDN(<12/22/1998) and (film or photography or photographic) and (recall or | Search | Clear

Database: Multiple databases... Select multiple databases

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Databases selected: Multiple databases...

V #18

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All sources | Magazines | Trade Publications | Newspapers

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1. **NEXCOM and Kodak PhotoNet Online Enable Naval Personnel to View and Share Pictures with Family Over the Internet**
Business Editors. **Business Wire.** New York: Dec 22, 1998. p. 1
Full text | Abstract

2. **COMDEX Fall Exhibitor News Summary for Nov. 17**
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Full text | Abstract

3. **IXLA Expands Alliance With PictureVision; IXLA's Digital Photo Software To Interface with Kodak's PhotoNet Service**
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Full text | Abstract

4. **PictureVision & MGI Software Extend Leadership in Digital Photography with Support for Worldwide Digital Imaging Network**
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Full text | Abstract

5. **PictureVision, Inc. Technology Now Industry Standard in Online Photography**
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Full text | Abstract

6. **PictureVision and Photo Access Corporation Provide Digital Camera Users Direct Access to Photos Without a PC**
PR Newswire. New York: Nov 16, 1998. p. 1
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Text+Graphics | Page Image - PDF | Abstract

8. **Can Kodak r f cus?**
William J Holstein. **U.S. News & World Report.** Washington: Nov 9, 1998. Vol. 125, Iss. 18; p. 47 (3 pages)
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Anonymous. **Consumer Reports.** Yonkers: Nov 1998. Vol. 63, Iss. 11; p. 30 (5 pages)
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10. **Millions of Americans Will Share in Make A Differ nce Day Over the Internet Thanks to Kodak PhotoNet online**
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Tobi Elkin. **Brandweek.** New York: Oct 19, 1998. Vol. 39, Iss. 39; p. 5 (1 page)
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13. **Digital services top list of new Kodak products**
Anonymous. **Drug Store News.** New York: Oct 19, 1998. Vol. 20, Iss. 17; p. 83 (1 page)
Full text Page Image - PDF Abstract

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Business Editors. **Business Wire.** New York: Sep 28, 1998. p. 1
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15. **At Photokina, Kodak Extends Worldwide Leadership In Consumer, Professional And Digital Photography New Product Portfolio Positions Kodak For Future Growth**
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16. **Photography by JCPenney and PictureVision Bring Online Portraits To Consumers Nationwide**
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17. **Microsoft Announces Picture It! 99: Great Just Got Better With Third Version Of Leading Photo-Editing Software**
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18. **DIGITAL L.A.; GET THE PICTURE MORE COMPANIES MAKING THE PHOTO-COMPUTER LINK**
David Bloom. **Daily News.** Los Angeles, Calif.: Sep 5, 1998. p. L.3
Full text Abstract

19. **Digital-camera vendors focus on the film-quality print**
Jon Hanke. **Pr sentations.** Minneapolis: Sep 1998. Vol. 12, Iss. 9; p. 13 (2 pages)
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Anonymous. **DSN Retailing Today.** New York: Aug 24, 1998. Vol. 37, Iss. 16; p. 47 (1 page)

Full text Page Image - PDF Citation

21. **SHARING SNAPSHOTS ON THE WEB USING DIGITAL IMAGING TO CREATE AN INTERNET PHOTO ALBUM FOR FAMILY AND FRIENDS ALL AROUND THE WORLD CAN BE AS CONVENIENT AS SENDING A MASS E-MAIL FROM YOUR PC AT HOME; [STATEWIDE Edition]**
JOHN M. MORAN, Courant Staff Writer. **Hartford Courant.** Hartford, Conn.: Aug 20, 1998. p. F.1
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22. **New development: Web photos; [CITY Edition]**
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Full text Abstract

23. **PICTURE PERFECT PHOTONET PUTS SNAPSHOTS IN DIGITAL FORM FOR ONLINE USE**
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Lisa Greim Rocky Mountain News Staff Writer. **Rocky Mountain News.** Denver, Colo.: Aug 3, 1998. p. 2.B
Full text Abstract

25. **On Wall St., a Kodak Moment; Turnaround Shows Company Can Do What's Needed -- and Fast; [FINAL Edition]**
Martha M. Hamilton. **The Washington Post.** Washington, D.C.: Aug 2, 1998. p. H.02
Full text Abstract

26. **STAYING IN; [FIVE STAR LIFT Edition]**
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Full text Abstract

27. **Consumer Concerns: Be wary shifting debts**
Charleston Daily Mail. Charleston, W.V.: Jul 13, 1998. p. 1.D
Full text Abstract

28. **PERSONAL TECHNOLOGY; With Online Finishing, Family Photos Are a Click Away; [Home Edition]**
JIM HEID. **Los Angeles Times.** Los Angeles, Calif.: Jun 29, 1998. p. 3
Full text Abstract

29. **Microsoft Announces Immediate Availability of Windows 98 In More Than 40 Countries**
PR Newswire. New York: Jun 25, 1998. p. 1
Full text Abstract

30. **Kodak DC220 And DC260 Digital Cameras Are Shipping To Retailers Across The Country Cameras Are Optimized For USB Interface Supported in Windows 98**
Business Editors. **Business Wire.** New York: Jun 24, 1998. p. 1
Full text Abstract

Results per page: 30

Basic Search Tools: Search Tips Browse Topics 1 Recent Searches

PDN(<12/22/1998) and photonet and (disk or disc) Search Clear

Database: Multiple databases... Select multiple databases

Date range: All dates

Limit results to: ☑ Full text articles only

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V Bloom

DIGITAL L.A.; GET THE PICTURE MORE COMPANIES MAKING THE PHOTO-COMPUTER LINK

David Bloom. **Daily News**. Los Angeles: Sep 5, 1998. pg. L.3

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Author(s):	David Bloom
Section:	*L.A. Life*
Publication title:	Daily News. Los Angeles: Sep 5, 1998. pg. L.3
Source Type:	Newspaper
ProQuest document ID:	33742622
Text Word Count	1286
Article URL:	http://gateway.proquest.com/openurl?ctx_ver=z39.88-2003&res_id=xri:pqd&rft_val_fmt=ori:fmt:kev:mtx:journal&genre=article&rft_id=xri:pqd:did=00000003

Abstract (Article Summary)

So you can't quite make that roll of snapshots from last month's vacation fit into your computer, or onto a T-shirt to send Grandma for a present. Well, ⓘSony has some nifty new services to help at its ImageStation on **PhotoNet** (http://imagestation.sony.com).

A simpler, far cheaper approach, as you await the inevitable fall in price and rise in quality for digital cameras, is to use a service such as ⓘSony's. Once your pictures are in a computer-readable format, cheap software such as Adobe's Photo Deluxe or MetaCreations' Super Goo will allow you to eliminate small flaws such as "red eye," apply a variety of special effects, even combine several photos into one composite shot.

ImageStation will either print your digital photos to high-quality paper, or convert film to digital format. The computerized pictures are returned by way of the Net, stuck in a private folder accessible from your Web browser for review and downloading.

Full Text (1286 words)

To reach David Bloom with stories, tips and other information on the intersection of art, entertainment and technology, contact him by e-mail at davidbloomearthlink.net

So you can't quite make that roll of snapshots from last month's vacation fit into your computer, or onto a T-shirt to send Grandma for a present. Well, ⓘSony has some nifty new services to help at its ImageStation on **PhotoNet** (http://imagestation.sony.com).

ⓘSony is one of a handful of companies offering development and digitization services for people trying to move their pictures back and forth between the real world and the computer one.

The easiest way, of course, is with your own digital camera, which will take electronic pictures that can be dumped

directly into a computer.

But even the cheapest and least of these costs a few hundred dollars, as much as a decent 35mm single-lens reflex camera. And the SLR camera offers far more filter and lens options and higher-quality pictures, assuming you keep your finger out of the shot.

A simpler, far cheaper approach, as you await the inevitable fall in price and rise in quality for digital cameras, is to use a service such as ⓘSony's. Once your pictures are in a computer-readable format, cheap software such as Adobe's Photo Deluxe or MetaCreations' Super Goo will allow you to eliminate small flaws such as "red eye," apply a variety of special effects, even combine several photos into one composite shot.

The finished products then can be printed out on inexpensive color ink-jet printers, or sent to ⓘSony or its competitors.

ImageStation will either print your digital photos to high-quality paper, or convert film to digital format. The computerized pictures are returned by way of the Net, stuck in a private folder accessible from your Web browser for review and downloading.

One handy feature allows the customer to create a public folder with some or all of the pictures, so friends and family can view or even order paper or electronic copies of the pictures. My technologically impaired father reported a series of problems downloading the shared folder, however, so you may instead choose to download them yourself and e-mail copies.

After 30 days online, you can pay a small sum to keep the folder available, though the smarter thing for the Net-savvy is to move the pictures to a personal Web site available free at any of the many Web locations offering free space to cyber-homesteaders.

ImageStation takes a couple of weeks to return developed pictures, a little less to return the easily downloaded digital versions. Printed versions of the electronic photos are fairly sharp, even on an inexpensive ink-jet printer.

And ImageStation also will print the photos on such things as coffee mugs, T-shirts and hats.

The service is competing with Seattle Filmworks, which has been providing digital photos over the Net for a few years now. The difference is that Seattle Filmworks always develops the film as slides or prints and charges a few dollars extra for digital copies.

ImageStation provides the option of having the pictures only digitized, with no negatives or printed versions.

Another difference is that Filmworks' pictures are in a proprietary format it claims is quicker to download and more compact than the widely used, Internet-friendly JPEG format that ⓘSony has used.

Filmworks provides a free small program called Picture Works that organizes the photos into albums and slide shows and can convert them to more common formats, which in turn can be converted to JPEGs with another program.

Filmworks also sells an array of other inexpensive programs, including editing, retouching and publishing titles, for $29.95 to $39.95.

Another program, Photoworks Composer, comes with templates to create personalized greeting cards, calendars, stationery and more that can then be uploaded to Seattle Filmworks for printing.

Filmworks' prices are competitive and also give the option of returning the digitized pictures on a floppy **disk** instead of through the Internet. The company also sends a free roll of film with each roll it develops.

Filmworks will send you two free rolls of film for trying out their service; just check the Web site at www.filmworks.com for more information.

And for other photo-based gifts, you also can try Reliance Color Labs in Swansea, Mass., (www.reliancecolor.com/). The longtime photo- developing house will turn your pictures into cards, calendars, watches, wall clocks, puzzles, placemats, mouse pads and shirts.

`Use Sunscreen'

It may be the oddest little song on radio these days, but I love it. And it comes with its own Internet hoax hook for extra juice. The song is "Everybody's Free (To Use Sunscreen)," and has been popping up on KCRW-FM (89.9) playlists and a few other places.

The heart of the song is a wonderfully whacked fake graduation speech that originally was a column by Chicago Tribune writer Mary Schmich. Somehow, the Internet claimed the column for its own, transmuting it into an alleged speech by novelist Kurt Vonnegut to graduates at ⓘMIT.

The speech, read by Tim Perry over wonderful dance music, includes some great nuggets of wisdom, such as: "Don't worry about the future, or worry but know that worrying is as effective as trying to solve an algebra equation by chewing bubble gum. The real troubles in your life are as apt to be things that never crossed your worried mind." and "Do not read beauty magazines, they will only make you feel ugly."

The song was put together by Quindon Tarver and appeared in director Baz Lurhmann's film "Romeo + Juliet." More recently, the eclectic Lurhmann included it in a wildly diverse collection of music from his films, plays and opera work called "Something for Everybody." Check it out.

An Internet-athon?

It was inevitable, probably, but now the Muscular Dystrophy Association's annual Labor Day Telethon, hosted by Jerry Lewis for 33 years now, is being carried on the Internet for the first time at the organization's Web site (www.mdausa.org).

The telecast begins at 6 p.m. Sunday and runs for 21-1/2 hours and is TV's most successful fund-raiser, bringing in $50 million last year to finance research on a series of wasting diseases such as myasthenia gravis, amyotrophic lateral sclerosis and polymyositis, as well as muscular dystrophy itself.

Chatterboxes

You may not spend much time on the Internet in chat rooms, but someone sure is.

Chatting ranks third behind information searches and e-mail as the most-used activities on the Net, according to Myra Stark, a senior vice president and director of knowledge management and consumer insights at Saatchi & Saatchi Advertising in New York.

And chat rooms consume 26 percent of all the time spent on the Net, according to Stark. So if you do use chat rooms, take heart. You really aren't alone.

And that chat is taking people away from their television screens, according to a study by ⓘNielsen Media Research that was commissioned by ⓘAmerica Online. ⓘNielsen surveyed about 4,700 households that use its People Meters and found that those with Internet access spent about 15 percent less time watching television.

A study last year of Internet users said the television was the activity they were most likely to reduce while on the Web. Though ⓘAOL used the most recent study to tout itself as a place for advertising targeting wealthier households, the real question will be what this all means for the rapidly diminishing market share of network television.

ⓘNielsen also reported that 79 million people are now using the Internet, a 36 percent jump in just nine months. For the first time, more than half the people between 16 and 34 are using the Internet as well, ⓘNielsen reported. And 13 million people above the age of 50 are using the Internet.

[Illustration]
Photo; Caption: PHOTO: no caption (ImageStation homepage)

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W Lipton

Product traceability: A guide for locating recalled manufactured goods

Gigi M Lipton. **Quality Congress. ASQC ... Annual Quality Congress Proceedings**. Milwaukee: 1998. pg. 423, 9 pgs

» Jump to full text

Author(s):	Gigi M Lipton
Publication title:	Quality Congress. ASQC ... Annual Quality Congress Proceedings. Milwaukee: 1998. pg. 423, 9 pgs
Source Type:	Periodical
ISSN/ISBN:	10807764
ProQuest document ID:	36002572
Text Word Count	5245
Article URL:	http://gateway.proquest.com/openurl?ctx_ver=z39.88-2003&res_id=xri:pqd&rft_val_fmt=ori:fmt:kev:mtx:journal&genre=article&rft_id=xri:pqd:did=00000003

Full Text (5245 words)

[Headnote]
SUMMARY

[Headnote]
The ability to trace and locate a product for **recall** and the ability to remove it or repair it in the marketplace relies implicitly on the ability to identify the location of the product. The perpetual evolution and complexity of the global marketplace makes it challenging to identify and track product movement for an adequate period of time. Properly analyzed and implemented, technology can be harnessed to provide an efficient and effective product traceability solution.
KEY WORDS
product identification, product location tracking, traceability

INTRODUCTION

A product traceability strategy is a vital component of the **recall** plan. The methodology for planning a traceable **recall** takes into account the type of product, the length of life of the product, the scope of the product's manufacturing process, the scope and **manufacturer's** level of control over the product's distribution channels, and the potential for hazardous damage. The importance of using a cost-benefit decision-making model at each stage of **recall** planning is significant in achieving an optimal minimal risk traceability strategy. Technology exists to support the appropriate selection of identification methods and record-keeping processes to identify and remove products from distribution or consumer use quickly. Properly implemented, a traceable **recall** will increase public safety and will reduce costs associated with **recall** exposure.

THE RISK OF **RECALL**

The ability to trace and locate a product quickly is the most critical part of any **recall** action and the importance of speed escalates and becomes more difficult the further the product is physically away from its point of manufacture.

The importance of speed further escalates the more hazardous the defect. The scope of the **recall** expands the greater the number of multisite manufacturing processes and product storage locations. If the product is already in the hands of the consumer and a **recall** process has not been adopted from the product's inception, the **recall** process is most expensive and most dishonoring to the **manufacturer** effecting a publicly visible **recall**.

The controls necessary to provide reasonable and adequate traceability may appear to be expensive in terms of inventory procedures, special packaging or segregation, and individual piece or lot identification. However, these costs are minimal when weighed against the costs of an unplanned product **recall**. It is important, therefore, that a proper balance be established between cost and risk.

The degree of traceability detail required for a traceability strategy depends on the level of **recall** risk potential of the product.

A high risk, complicated consumer product such as an automobile or power drill may call for a high degree of traceability from suppliers of raw material through to the ultimate consumer. A lower risk product such a pair of shoes or battery-operated calculator may not require stringent traceability requirements due to the relatively low potential of safety-related problems or a comparatively short useful life. Logically then, in low risk products, individual identification of each unit is not necessary. It may be sufficient to know, only generally, what went into a given week's or month's worth of production and/or in what general geographic region the item is located. When evaluating cost versus risk, a balance should be achieved with respect to the likelihood of a product **recall** situation arising. Where the likelihood is significant, added costs are justified in order to ensure an efficient, prompt recovery.

A necessary first step, then, in formulating a traceability strategy is to rate the product according to the potential for **r call**. A product may be classified as having a significant risk of **recall** if it contains an inherent risk of injury or economic loss that will not be removed by redesign or improved manufacturing practices.

Some of the many reasons a product may be classified as having a significant risk are if the product

Is or could become inherently dangerous

Could become unsafe or dangerous due to prolonged use or deterioration of physical characteristics with time

Could be used in an improper manner rendering it dangerous

Could be used functionally in an application or activity which is dangerous

Has a high volume of usage or long service life and could provide a base for major economic loss in the

event of unreliable performance, representations, or failure to meet customer expectations

Class is governed by law. Traceability requirements may be self-imposed or mandatory. Some of the U.S. government bodies that impact significantly on product **recalls** are the

- Food and Drug Administration (FDA)

- Consumer Product Safety Commission (CPSC)

- National Highway Traffic Safety Administration (NHTSA)

- Department of Transportation (DOT)

- Bureau of Mines (BOM)

- Department of Agriculture (USDA)

- Federal Aviation Agency (FAA)

Most of these government agencies require prompt notification in the event that either the risk of injury or the severity of possible injury, or both, is suspected to be substantial, or if applicable mandatory standards or regulations are violated. These agencies conduct inquiries based on complaints and on their own research. Some of these agencies can force a product **recall**, depending on the severity of the situation.

RESPONSIBILITY FOR TRACEABILITY

Once the potential for **recall** and the need for product traceability has been established, a decision needs to be made as to the level of tracking responsibility accepted by the supplier of raw material, component, subassembly, **manufacturer**, **distributor**, wholesaler, **retailer**, and consumer.

When the risk of **recall** is significant, a traceability and record retention strategy by the assembler of the final product is a critical part of the manufacturing plan to maintain public safety.

In situations where traceability costs are excessive, reliance may be placed on a lower cost, reasonable, and optimally effective notification system via mass media.

Source marking product components with identification will allow for the most detailed identification of the product. Product identification information may be subsequently affixed to the product, although less information will be available regarding product composition, date of manufacture, lot, and other traceable production details.

The requirement to link the product to its location each time the product moves will require the support of the traceability strategy by suppliers, **distributors**, wholesalers, and **retailers**. The most difficult link is between the product and the consumer.

If a **recall** is required because of the failure of a purchased critical component and the supplier cannot isolate the problem into groups, lots, or batches, the **recall** will have to be far-reaching, non-selective, and expensive. If, the supplier's quality control and inspection records allowed for the identification of a small group of nonconforming components, the **recall** could be much more specific, more effective, and less costly. Both the type of identification record and its retention time should be considered. A complete set of records is of little use if the retention time is significantly less than the useful life of the product.

Downstream traceability is a factor in a product **recall** when middlemen come between the **manufacturer** and the ultimate consumer. When the risk of **recall** is significant, downstream middlemen must support the required traceability. In such cases, agreements with middlemen, such as **distributors**, should be made in advance to set up a traceability system.

The lot shipping records of a **distributor** can be a significant asset to an effective **recall**, and in many industries, **distributor** records are an essential aspect of the notification system for **recall**. The **manufacturer** of a product having a significant risk of **recall** should examine and link to the record-keeping practices of the distribution system.

Product identification and tracking systems integrated into the **manufacturer's** inventory control process can be used to facilitate **recall** traceability. The resulting cost savings in adding or modifying inventory control should more than outweigh the added costs of traceability.

COST OF TRACEABILITY

In addition to being an ethical decision, the level of traceability is an economic decision, as shown in Figure 1.

Assuming no traceability strategy, the cost of a **recall** will be the total number of goods (both conforming and defective) multiplied by the unit cost plus other costs associated with the **recall**.

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Assuming perfect traceability, the cost of a **recall** will be the exact number of defective products multiplied by the unit cost plus the cost of the traceability infrastructure plus other costs associated with the **recall**.

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Enlarge 400%

The optimal amount to spend on traceability is achieved along the line identified as (1) the allocated cost of traceability. At any other point, a program that will provide traceability to a more detailed or a less detailed level is more costly.

A cost evaluation of the degree to which traceability is both optimal and economically feasible depends on factors such as: the product's retail selling price, whether it has regular or seasonal usage, its frequency of use, whether or not it has secondary users, the physical environment for its use or for its storage, repair and service costs, exposure to the public, moral responsibility, and regulatory responsibility.

An individual assessment should be made for each product category based on the following criteria.

As the unit cost increases, so does the need for traceability. The cost of **recalling** only defective products would be less than a total **recall**. Unit cost includes the cost of design, manufacture, distribution, and the costs associated with the sale of the product.

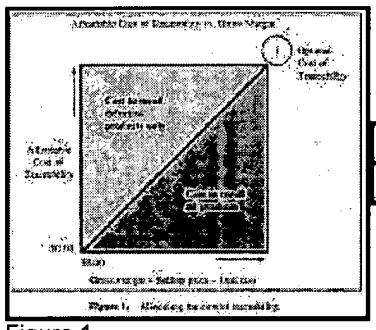

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Figure 1.

If the life of the product is long, many more products will have to be **recalled** and the requirement to hold records will be longer.

If there are frequent manufacturing changes during production, it will be more important to segregate for traceability especially if the product or product components represent a high risk of defect.

If the product can be modified outside of the production plant, traceability along distribution channels and through to consumers is most important. In this case, modification should be evaluated as a lower cost alternative than **recall**.

If the product is complex, the higher the components' value, the greater the need for traceability. The anticipated reason for a potential **recall** will also affect the desired degree of traceability. If the reason is due to a **manufacturer's** quality assurance test or a design change, inventory control at the plant level would be sufficient. If the problem relates to installation or product use, then the need for traceability through the product's distribution channel to the final consumer would be required.

The level of detail in record-keeping required at the point of manufacture will depend on the specific product's possible point of failure and the complexity of the product.

The assessment of the need and extent for traceability will extend specifically to the choice of product identification methods at point of manufacture and tracking methods used to identify the location of the product during its life cycle.

In general, the product should be identified at the lowest level economically possible in order to maintain identification of like items. The cost of an inventory management system which integrates product traceability capabilities typically ranges from a paper label produced by a bar code printer for less than half a cent to a turnkey off-site traceability networked system from 25 cents per product. The need for permanency, th need for overt vs.

covert methods of identification, and the cost of the identification, output, recording, collection, and storage methods will all bear on the cost analysis.

Typically, the fixed cost components of an inventory management system, which can be used for planning traceability, include

1. The bar code or other identification device.

2. The data recording method.

3. The data collection device.

4. The mass storage device.

5. The information management system.

The cost savings available when **manufacturers** are able to pinpoint the product to be **recalled** is inversely proportional to the number of items that must be **recalled**.

TRACEABILITY AT POINT OF MANUFACTURE

At point of manufacture, the level of detail may include parts data, **serial numbers**, model numbers, brand name identification, and class identification, as well as engineering changes, critical process lists, date of manufacture, product configuration, control information, raw materials suppliers, parts suppliers, subassembly suppliers, changes, tests and test results, **manufacturer**, contact information, part color, lot, size, and material composition. Serial and model numbers are often used for marking high-priced items, while dating is commonly used for marking lower priced items.

The degree of visibility of the identifying mark may be decreased if there is benefit to the **manufacturer** in expediting the **recall** or if, by disclosure of a mark, the consumer may become wary of purchase. Otherwise, a visible mark means that a greater reliance can be given to the holder of the product to aid in the identification of a **recalled** product. Covert methods of identification include invisible liquids, inks, and chips. Overt methods of identification include tags, plates, stamps, and labels.

Direct imaging printing equipment, laser engraving, or etching equipment, as well as laser and thermal transfer label printers are available to mark a variety of surfaces and can apply identification to products directly, or on adhesive labels, textile labels, or plates which are then applied manually or through robotics or through other equipment at the point of manufacture. The identification device can store a reference key to information stored elsewhere (like a license plate) or the information itself.

Identification records can be manually entered into a computer system, held in paper files, or scanned to update a centralized data storage device. Scanning systems are available in fixed mount or hand-held, mobile and fixed configurations. The location at which the scanning will take place plays an important role in determining the most appropriate configuration. If a bar code system is selected, there will be different costs associated with one-dimensional (1-D) and two-dimensional (2-D) readers. 2-D readers are backwardly compatible and read 1-D codes like UPC, while 1-D readers may be incapable of reading 2-D codes and may actually be code specific.

More than 20 bar code languages have been developed, each with its own unique specification. The most widely used is the UPC, or universal product code, which consumers see in grocery stores. Tiered and 2-D matrix codes which allow for increased storage of product data include Intermec Inc.'s Code 49, Laserlight Systems Inc.'s Code 16K and Code One, International Data Matrix Inc.'s Data Code as well as ⓘSymbol Technologies Inc.'s PDF417 and MicroPDF A MicroPDF code for example, is capable of storing up to 200 characters and can store 60 characters in a bar code as small as 1/4" square. Similarly, Intermec's 2-D matrix code stores 1000 characters in a 1" square. By comparison, a 1-D code typically has a data capacity of 20 to 30 characters.

2-D codes allow **manufacturers** to track production of complex products, with fewer computer support resources. The 2-D bar code can be scanned to tell workers, or a robot, where a part came from, what needs to be done,

where it has to go next, and when. An updated bar code reflecting completion of the work can be printed out and attached to the part before sending it on. The complete record can be put in the main computer system of the plant at the end of each production cycle. 2-D codes are also a useful way to keep production records and maintenance schedules.

The greater the speed with which product information is available from an integrated system, the less the requirement to have the increased information storage capabilities of 2-D codes.

The greater the product's life, the greater the importance of redundancy afforded by 2-D codes. 2-D codes can be partially damaged or defaced yet will allow scanners to recover 100 percent of the stored data. Before deciding on a bar code standard, review compatibility among readers along your distribution channels. It may be advantageous to select a compatible code.

Industry groups such as automotive (AIAG and ATA), electronics (EIA), telecommunications (TCIF), chemical and petroleum (CDIX), and retail/consumer goods (UCC, EAN) have standardized on compliance for product identification labels to a large degree, even tying them to their EDI and ASN (advance shipping notice) programs. The ANSI (American National Standards Institute) MH1O 1993 standard plays a highly influential role in the development of bar code label compliance by establishing industry guidelines. The Automatic Identification **Manufacturers**' Standards Committee (AIM) also plays a vital role in product marking standards.

The data collection device may include a portable scanning terminal with a temporary data storage area requiring subsequent data transfer to a central computer system capable of mass data storage or may travel along a local or wide area network to the mass storage system directly.

The number of potential distribution and storage locations as well as the degree to which traceability is desired will determine the level of integration desirable among compatible manufacturing, wholesale, and retail data collection and storage devices. edi, pos debit, pos credit, and mondex are examples of data networking systems with a high degree of compatibility.

The mass storage device and degree of redundancy selected should match information storage and data retrieval requirements appropriate to the product category. As shown in Table 1, the length of time which records should be maintained will depend on the initial **recall** risk analysis attributable to the product category.

Although the time recommended for record retention is lengthy, economical methods exist for on-site record storage and off-site record storage. Tracking and microfilming services are examples of off-site storage methods. Onsite, low-cost personal computer hard drives support mass data storage. For redundancy and long-term retention, devices such as read/write cd rom, Magneto Optical drives, and tape drives such as DAT, zIP and JAZZ as well as mirrored or otherwise distributed hard drives are used to store large amounts of data in more than one location.

When the need to effect a **recall** becomes a reality, it is important to be able to find the records necessary to trace and locate the product quickly and easily. The software component of the information management system must include reporting capabilities to allow for efficient data retrieval.

TRACEABILITY AT VARIOUS LEVELS OF DISTRIBUTION

The need to retain records is important for both suppliers of raw materials as well as for **manufacturers** of the final product. Suppliers of raw material, component parts, and subassemblies may be held partially liable in a product **recall** suit and should be prepared to assist in the **recall** process wherever possible.

In conducting a **recall**, the knowledge of where to make the initial inquiries to have product returned would be extremely helpful and would reduce the costs associated with the **recall**. In initiating a **recall** procedure, the two questions that must be answered quickly are

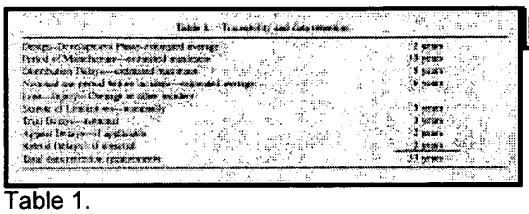
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Table 1.

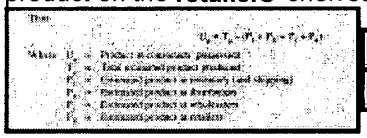
1. Which product, by type of design, by type of change, by date of manufacture, or by type (or specific supplier) of a subassembly must be **recalled**?

2. What is the location of the product to be **recalled**? Inventory, storage distribution, wholesalers, **retailers**, or final consumers?

The first question is answered by the engineering, manufacturing, and test records. The second question is obtained by the records of marketing and distribution organizations.

If you know the quantity of questionable product produced, you will be able to rapidly collect data, identifying how much has been sold to the final consumer. First, the quantity of product in the **manufacturer's** inventory and in the shipping department can be isolated. Then, the quantity of product on the shelves of **distributors** and wholesalers must be determined. The balance of items produced is on the shelves of **retailers** or has been sold to consumers.

By working with **distributors** and/or wholesalers, systems can be established which will identify the quantities of the suspected product that have gone to **retailers**. A system may be developed to cross check returned warranty cards or other possible proofs of purchases which can help prepare an estimate of the number of suspected product on the **retailers'** shelves or in the customers' hands.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Quantity determination of product and obtaining its return from **distributors**, wholesalers, and **retailers** is easier in the absence of a final consumer registration method.

Meticulous care in identification and documentation by the supplier of raw material and the final assembler can be rendered ineffective by haphazard distribution records. If downstream **distributors**, **retailers**, or warehousemen are unable or unwilling to maintain a traceability system consistent with a significant risk product it may become necessary to compensate for this loss by designing in a means of adequate identification.

Again, bar coding can play a significant role in the ease with which traceability is effected. During the shipping process, instead of typing out lists of the contents of a shipment and its routing, a company could print the information in 2-D bar code form and fax it to shippers and **retailers**, who would then scan it to put the data into their computer files. The same bar code would be attached to the shipment to facilitate traceability. From then on, all parties involved in the stream of trade would have a much easier time tracking the goods, leading to fewer distribution errors, better scheduling of trucks and warehouse space, quicker recording of transfers, and smoother re-ordering.

To ensure record-keeping system integrity, a periodic review of records should be effected with the following goals in mind.

Identify the product by date or short period of manufacture, by a given configuration, or by a block of **serial numbers**, or by some other level of detail.

If the product to be **recalled** is produced at more than one location, the location should be identifiable on the product.

If the product is produced by a multiple molding or costing procedure, the mold identification or casting location

should be identifiable on the product or component.

If product tests are conducted, the test results should be identified to a configuration of the product or a design change of the product or a period of manufacturing of the product such as a date code.

A first-in first-out (FIFO) plan should be used in shipping product from inventory or from storage.

Accurate records should be maintained as to shipments made to **distributors**, wholesalers, and **retailers**.

Warranty cards should be kept and recorded. Some other type of customer contact information should be retained. Cards should be identifiable as to the date of product manufacture or configuration or **serial number**.

Any periodic audit should include a legal review.

With system links at stages of product movement, generating and retaining the desired level of traceability, the least cost, most effective **recall** is made possible.

CASE STUDY: A BAR-CODED PRODUCT

TRACKING SYSTEM

Using world-class technology including ⓘSymbol Technologies Inc.'s PDF417 bar code and scanning technologies as well as Lumonics Inc.'s laser etching equipment, the Tracker system links products through an international network of scanning stations to a 24-hour multilingual call center and data warehouse.

At the heart of this global product tracking system, the Tracker insignia is licensed to **manufacturers** for source marking products. The insignia is laser etched, direct imaged onto labels or otherwise incorporated into the existing product labeling process. The insignia replaces the product **serial number** transparently or facilitates the introduction of a standardized product identification mark.

Manufacturers, **distributors**, and **retailers** use prefabricated permanent adhesive, textile, and metal Tracker insignia for post-production application.

This product tracking system was originally designed to facilitate the fast, free return of recovered lost and stolen property. Strategic partnerships are integral to the integrity of the Tracker system. ⓘDHL, Purolator, and Mailboxes Etc./UPS allow Tracker to return ship recovered property directly to the owner anywhere in the world through unique packaging and billing agreements. In addition, Tracker maintains a database of taxi, courier, and service companies and is committed to make special shipping arrangements in areas where courier services are not available.

Tracker's worldwide identification and recovery service has received the endorsement of The International Association of Chiefs of Police.

The Tracker system offers a complete method of global inventory control, warranty tracking, retail reporting, prepaid lost and stolen property courier return, as well as fast, efficient direct customer contact for product **recall**. Even so, customer security and privacy are held in high regard. Tracker will not sell, lend or use database information for any purpose other than providing global Tracker service or as required by law. The Tracker system is designed to protect products associated with the following industries (and can be tailored to other manufactured products): **photography**, electronics, computers, wireless communication, sports, footwear, eyewear, watches, travel and tourism, university, dolls and plush toys, automotive, clothing, power tools, home security, insurance, pets, moving, and luggage.

Manufactur rs use the Tracker system in whole or in part to achieve the desired level of benefits and control. Service depots worldwide can determine the warranty status of a product instantly without incurring warranty administration costs. Retail customer service or **manufacturer's** representatives similarly obtain store purchase information. Law enforcement agencies, transportation authorities, and other high-traffic public venues scan recovered property to facilitate its return. Of additional benefit to **manufactur rs**, **distributors**, wholesalers,

r tailers, and consumers, the property return benefit of the system (guaranteed worldwide free return of recovered lost and stolen products) results in increased sales and increased customer satisfaction as well as lower manufacturing/replacement costs resulting from loss and theft.

Tracker hopes to become an intrinsic part of **manufacturer's** product **recall** plans by providing turnkey assistance for implementation. For example, product traceability is improved as Atlas Umbrellas by Oscardo add the Tracker insignia to their material composition labels as shown in Figure 2. These products can be easily scanned when they leave Oscardo's manufacturing plant and at each stage of the product's distribution cycle. Consumers register their purchase at point of sale to minimize the risk of losing their umbrella. Should umbrella fabric hazards be discovered and require **recall**, Tracker is able to identify customer ownership, **manufacturer** production sites, and wholesale and retail distribution locations within seconds. The speed at which the **recall** would be effected through direct channel and consumer contact would save the **manufacturer** time, money, and most importantly, business integrity.

Over 36 billion products can be marked with the bar-coded Tracker insignia. Tracker expects that, over the next two years, more than 500,000,000 products will be source marked.

The process of integrating the Tracker insignia includes four stages.

1. The **manufacturer** becomes Tracker Friendly. New requirements (if any) for marking equipment are identified, evaluated, scheduled, installed, and tested. Modem transfer of insignia licenses takes place

2. **Manufacturer** begins Tracker insignia marking. Each product is etched, scanned, and verified at a point on the line where the product can be presented to the laser for the ideal mark location. Alternatively, precoded labels or plates are affixed seamlessly, as part of the product labeling process. Product packaging is labeled with UPC bar code equivalent. Activation cards are inserted into the packaging of each product before it is sealed. Following each lot's marking, the **manufacturer** modem transfers product and code data to Tracker. Tracker holds product and code information in a central data storage warehouse.

3. The **manufacturer** takes advantage of global inventory control. At the **manufacturer's** loading dock, at each wholesale distribution center, and at each retail warehouse, the inventory is scanned, particularly if a shipment's outer casing shows signs of tampering. Tracker hot lists any missing inventory.

4. The **retailer** becomes Tracker friendly. At the retail site, each product code is linked to the customer's name, address, and phone number. This contact information is made available to Tracker along with the store name, location, **manufacturer**/product, and the purchase date and time. Tracker activates the code for recovery service coverage, linking the code to the customer's name, address, and telephone number.

The code is cross-referenced to hot listed information already on file. Hot listed code matches are sent to both the **manufacturer** and the law enforcement agency in the **manufacturer's** jurisdiction. In the absence of transmitted product information, the code is cross referenced and linked to **manufacturer** product information already on file. Sale date information is made available to the **manufacturer** and the **manufacturer's** and **retailer's** service agencies on demand.

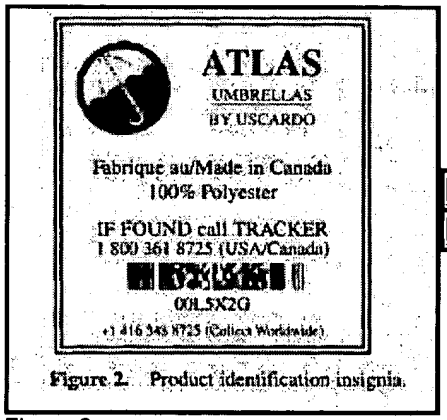

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Figure 2.

Depending on the **retailer's** level of automation, Tracker can receive sale and customer information through the **retailer's** POS system, from merchant processing facilities, from banking and cashless processing facilities, or through the use of a Tracker registration terminal at the customer service desk. Alternatively, the customer or **retailer** can call toll free to register or the customer or **retailer** can send the activation card to Tracker. For example, in the absence of POS terminals, select Schwinn bicycle **retailers** have set up Tracker service activation hotlines at point of sale.

The record of the customer's name, address, and phone number is accessed by Tracker upon recovery. Trained recovery agents secure the item, contact the customer, and make return shipping arrangements. Identification records are not purged from the Tracker system; should the owner choose not to renew his or her subscription for loss and theft recovery protection, he or she is offered the option to recover the item at preferred courier rates.

With the global Tracker system, products are identified with one standardized and recognizable mark. The insignia is easily output by marking equipment, as the PDF417 bar code is ANSI compliant and in the public domain. The power of the 2-D PDF417 code and portable data collection devices allows **manufacturers** to identify products at the lowest component level. Tracker eliminates the requirement to maintain extensive on-site records of product movement and makes it easier, less costly, and faster to control inventory. Tracker allows for the identification of the location of a product at point of manufacture, importation, wholesale, and retail through a scan of the code at any point in the manufacturing or distribution cycle. With Tracker, warranty and retail fraud are eliminated, recovered property is returned free of change, and direct, low cost consumer contact is made possible.

Code licenses for product tracking and warranty and return services are available through the Tracker Corporation of America directly. The system improves product traceability through the use of a product identification standard linked to a global recovery infrastructure and makes it possible to have timely access to product location information. Tracker is most valuable as a component of the traceability strategy for products having a high risk of **recall** because it can be used as insurance to mitigate the cost and exposure of mass media advertising with fast, efficient, direct consumer contact.

CONCLUSION

The **recall** planning process includes an evaluation of the extent at which product traceability is both possible and desirable. Once the need is established, the ease and cost-effectiveness with which identification techniques seamlessly incorporate into the manufacturing process at the product labeling or source marking level are evaluated. Bar-coding, long used as a retail product identification standard, has become the universally accepted component and product marking standard for product identification in inventory control systems. **Manufacturer**, **distributor**, and retail inventory control systems that share quickly and accurately scanned data make the retrieval of product location information along the distribution continuum possible. The global, on-line availability of point-of-sale product registration data from a central source allows for direct consumer contact without delay. As the proliferation of product tracking technology continues, and as industry continues to take advantage of the inherent costs savings associated with global inventory control, so too does the ease of implementing complete product traceability strategies become a reality.

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CD-ROM GAINING ACCEPTANCE AMONG PROCESSORS Technology Faces Tough Competition From Internet Distribution

Item Processing Report. Potomac: Jun 18, 1998. Vol. 9, Iss. 12; pg. 1

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Abstract (Article Summary)

"More than 13,000 **check images**, including the front and back, can be stored on a single **CD**," says Bob Kirk, president of Enterprise Consulting, based in Plano, Texas. Customers can receive all their **check images** on a **daily**, **weekly**, or **monthly CD**, Kirk says.

While **CD-ROM** distribution of **check images** has been around for two to three years, it has gained wide acceptance in the last year, Kirk says. Kirk estimates that one-quarter of the national corporate banks are using **CD-ROM** distribution of **check images** for their large customers.

Kirk attributes the increasing acceptance of **CD-ROM** distribution to the drop in the cost of producing **CDs**. "A blank **CD** used to be $20, now it's about a buck. Two years ago, **CD** burners (which write code to blank **CD**-ROMs) capable of creating one **CD** at a time were $2,000 to $3,000 a piece. Now, an automatic system capable of burning 50 **CDs** and labeling them all at once costs $6,000 to $7,000," Kirk says.

Full Text (1199 words)

With its low infrastructure, development and implementation costs, **CD**-ROM distribution is promising to become the next favorite tool of the item processing executive. But don't tie all your growth strategies to **CD**-ROMs just yet.

The nation's largest banks, and even small financial institutions that process checks for large corporate customers increasingly are turning to **CD**-ROM dis-tribution of **check images**.

"More than 13,000 **check images**, including the front and back, can be stored on a single **CD**," says Bob Kirk, president of Enterprise Consulting, based in Plano, Texas. Customers can receive all their **check images** on a **daily**, **w ekly**, or **monthly CD**, Kirk says.

"This is the easiest method of storage for most customers. Most companies already have personal computers with **CD**-ROM drives, so no additional capital investment is required," says Kirk.

While CD-ROM distribution of **check images** has been around for two to three years, it has gained wide acceptance in the last year, Kirk says. Kirk estimates that one-quarter of the national corporate banks are using CD-ROM distribution of **check images** for their large customers.

Drop In Costs

Kirk attributes the increasing acceptance of CD-ROM distribution to the drop in the cost of producing **CDs**. "A blank **CD** used to be $20, now it's about a buck. Two years ago, **CD** burners (which write code to blank CD-ROMs) capable of creating one **CD** at a time were $2,000 to $3,000 a piece. Now, an automatic system capable of burning 50 **CDs** and labeling them all at once costs $6,000 to $7,000," Kirk says.

"The old style 'one at a time' **CD** burners are just a few hundred dollars now," Kirk adds.

Is The Internet Next?

But don't plan your entire business around these disks, warn some industry observers. **CD** distribution may be bypassed by an even newer method of distribution - Internet access to **check image** archives.

Many of the vendors selling **CD** production systems to financial institutions also are developing systems that allow Internet or direct dial-up access.

Smaller companies that might not need to use all the storage capacity of a **CD** for their **monthly** check cycle could be served by Internet access, and not have to bother with handling and storing **CDs**, Kirk says.

One-quarter of the banks offering **CD** distribution also are offering Internet or direct dial-up access, Kirk estimates.

Under the **CD** distribution model, the customer is charged a **monthly** service fee plus a cost per **CD**, usually on the order of several dollars per **CD**. With the Internet access model, the customer is charged a **monthly** service fee plus fees per **check image** accessed over the Internet. The per-check access fee is much less than the cost of a **CD**.

Kirk cites this as an example of "following the ⓘGillette philosophy - don't charge for the razor (in this case, the **CD**), charge for the blade (the **check image** accessed over the Internet)."

Adoption of the Internet access technology will be slowed by the absorption of corporate MIS resources devoted to the Year 2000 problem, Kirk says, but he foresees a more rapid adoption in later years.

Some vendors already are placing their bets on Internet access. IA Corp., a vendor of **CD check image** delivery systems, sells a **check image** archive system that allows access to billions of images over the Internet, including **check images** and other cash management documents.

Corporations likely will choose to scan their stored physical checks and place them in online archives, says Thierry Leger, an IA spokesman.

With 50 billion paper checks still being written per year (despite the availability of electronic financial transactions), approximately 350 billion **check images** must be stored because corporations need to save checks for seven years.

After digital imaging of current checks and scanning of stored checks for large corporate customers, the next frontier for check processing is the individual banking customer.

Within a few **months**, some banks will give individual retail customers the option of viewing images of their canceled checks over the Internet, rather than having the physical canceled checks mailed to them and stored at home, Leger predicts.

Improvements in imaging technology allowing for high-resolution, gray-scale images is making this option

potentially more attractive to retail customers, Leger adds.

Adoption of **CD** distribution of **check images** is a scale and cost issue for banks, says David Medeiros, an industry analyst with the Tower Group, based in Wellesley, Mass. "It is working out well for banks that have a large enough number of corporate customers with a high enough volume of checks and a high enough level of automation in their treasury departments."

The costs of implementing the technology and acquiring the necessary hardware, software and distribution networks are high. But for those banks whose customers scale of activity justifies it, adoption of the new technology is necessary.

"Any of the top 50 banks that hasn't done it yet, is behind the curve," Medeiros says. In time, prospects for adoption by broader sectors of the industry are good, and it will filter down to smaller banks and smaller customers.

Internet access to **check images** eventually may supplant **CD**-ROM distribution, but not for large customers in the near future. "The **CD** is ideal for distribution of large numbers of **check images**," Medeiros says. But a 50 kilobyte **check image** usually takes more than one minute to be transmitted over the Internet, too slow for large customers who need to research lots of checks quickly, Medeiros adds.

Internet access may be good for small customers who may only need to see a few **check images**, Medeiros says. It also is easier for the cash management executive to receive other wholesale lockbox information on a **CD** with the **check images** and have the data and documents available in-house for generating reports, than to access the same kind of information over the Internet.

Microfilm Not Going Away Soon

Microfilm archiving of **check images** will remain prevalent for the next few years, Medeiros insists. But eventually the seven-year image archives will migrate over to digital media. Unlike microfilm, digital media allows for easier searching, retrieval and copying, Medeiros says. Banks will be able to use digital archives to create new services and attract new customers. Large banks like Charlotte, N.C.-based NationsBank (NB), with assets of $310 billion, are in the process of converting their archives to digital media.

To date, large banks have led the way in offering **CD** distribution of **check images** to customers, says Ron Thompson, ImageSoft vice president of business development. He estimates more than half of the banks with more than $1 billion in assets are offering this service.

Thompson also foresees banks converting their archives to digital images. Thompson says that **CD** jukeboxes work well as image archives for small banks. A **CD** can hold 650 megabytes, which translates to about 13,000 **check images**.

Digital video disc (DVD) and optical platters capable of storing 10 to 20 times as many megabytes of images as a **CD** will become the storage medium of choice for large banks, instead of microfilm or magnetic tape systems, industry observers predict. (Bob Kirk, Enterprise Consulting, 972/985-7414; Thierry Leger, IA Corp., 510/450- 6816; David Medeiros, Tower Group, 617/965-9090, ext. 215; Ron Thompson, ImageSoft Technologies, 407/667-3707.)

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